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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/683,727	10/10/2003	Arthur Sherman	ASMMC.9CP1DV1C1	1627

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EXAMINER	
GAMBETTA, KELLY M	

ART UNIT	PAPER NUMBER
1792	

NOTIFICATION DATE	DELIVERY MODE
07/31/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/683,727	SHERMAN, ARTHUR	
	Examiner	Art Unit	
	KELLY GAMBETTA	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 April 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 27 April 2009 have been fully considered but they are not persuasive. The applicant argues that Dillon does not teach more than one monolayer of aluminum oxide formed as required by claim 1 and that the process of Dillon is self limiting. However, Dillon et al. discloses that the thickness of an aluminum oxide layer after each cycle depends upon the amount of amorphous aluminum oxide present and the reaction mechanism (see pages 239-241 et seq.) Therefore, the variable of aluminum oxide layer thickness is modified by routine experimentation and is not inventive. Though the applicant argues that the process of Dillon is self-limiting, Dillon discloses using the same precursor as the applicant, so if the use of this precursor was truly self-limiting, the "more than one monolayer" limitation in claim 1 would be improper. The applicant argues that their process is different because of the use of atomic oxygen, but this difference is immaterial considering the atomic oxygen is added after the trimethylaluminum flow is shut off. If flowing trimethylaluminum onto a substrate was truly a self limiting process, the oxygen precursor would not matter because it could then never make more of a monolayer of alumina because there would be a limited amount of aluminum to react it with. As such, the thickness of the trimethlaluminum is shown to be dependant upon reaction conditions, easily modified by one of ordinary skill in the art through routine experimentation. Further evidence, as in the form of a declaration or the like, would be needed to show that the process of Dillon is not in fact a result effective variable and can only result in a monolayer as the

applicant's representative asserts. As the claim is currently written, there are no distinguishing features over Dillon in view of Penneck that would cause more than one monolayer to be formed, so therefore one of ordinary skill in the art would realize that according to the claim, more than one monolayer may be possible with routine experimentation. Penneck further supports the utility of this with the same precursor, trimethyl aluminum, in column 14 lines 9-35. Anyone of ordinary skill in the art would recognize that the thickness of a deposited film, then, is a function of the time of substrate exposure to the precursor. In addition, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to create more than one monolayer per cycle, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Therefore, for at least these reasons, the rejections of the previous office action are maintained. New grounds of rejection are below for newly added claim 21.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 21 is rejected under 35 U.S.C. 112, first paragraph, because the best mode contemplated by the inventor has not been disclosed. Evidence of concealment of the best mode is based upon the instant specification, page 13 in the first paragraph.

The applicant admits in this section that when the precursor condenses on the substrate surface, it is "obviously no the way to operate the present process."

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dillon et al. (Surface Science 322(1995) 230-242) in view of US Patent number 4985313 to Penneck et al.

Regarding claim 1, Dillon et al. (in the abstract, among several other places in the document) discloses a process for growing aluminum oxide on a substrate in a single reaction chamber by a sequential chemical vapor deposition or an ABAB process

comprising a plurality of cycles with each cycle comprising exposing the substrate to gaseous trimethyl aluminum, stopping the flow of gaseous trimethyl aluminum which is consistently removed from the chamber by a vacuum pump, exposing the substrate to an oxygen source which is consistently removed from the chamber by a vacuum pump and forming an aluminum oxide film of approximately 0.22 mL per AB cycle (p241, column 1). Dillon et al. discloses that the thickness of an aluminum oxide layer after each cycle depends upon the amount of amorphous aluminum oxide present and the reaction mechanism (see pages 239-241 et seq.) Therefore, the variable of aluminum oxide layer thickness is modified by routine experimentation and is not inventive. it would have been obvious to a person having ordinary skill in the art at the time the invention was made to create more than one monolayer per cycle, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Dillon et al. does not teach using oxygen plasma as the oxygen source rather than water vapor but it is clear from the document that a layer free of contaminants is of importance to the study disclosed. Penneck et al. teaches using trimethyl aluminum as a precursor in column 14 lines 9-35 and then using an oxygen plasma, or atomic oxygen, to form a coating of the aluminum oxide (column 11 lines 1-18) in order to form a layer free of contaminants that would normally occur during wet deposition processes (columns 7 and 8 lines 59-21).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Dillon et al. to include using an oxygen plasma as an oxygen source

alternating with the aluminum source as taught by Penneck et al. in order to form a layer free of contaminants that would normally occur during wet deposition processes.

Regarding claim 2, Dillon et al. discloses that the thickness of an aluminum oxide layer after each cycle depends upon the amount of amorphous aluminum oxide present and the reaction mechanism (see pages 239-241 et seq.) Therefore, the variable of aluminum oxide layer thickness is modified by routine experimentation and is not inventive.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Dillon et al. to include a layer thickness of aluminum oxide as 3 A by routine experimentation depending upon the application of the layer absent evidence showing a criticality for the claimed value.

Regarding claim 3, Penneck et al. discloses that the plasma may be generated and used in a commercially available plasma oxidation unit in column 11 lines 1-7. A remote plasma generator would have been available to Penneck et al., or at least to those at the time of the invention. See, for example, US patents 4882008, 4949671, etc.

Regarding claim 4 that requires room temperature, Dillon et al. cites a temperature of 300 K (p 232), which may be considered room temperature at least as broadly as it is described in the claims. Dillon et al. also modify this variable throughout

the document to achieve different results due to reaction thermodynamics and reaction kinetics. Therefore, it also would have been obvious to one of ordinary skill in the art at the time of the invention to modify Dillon et al. to include a reaction temperature at room temperature absent evidence showing a criticality for room temperature.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KELLY GAMBETTA whose telephone number is (571)272-2668. The examiner can normally be reached on Monday - Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kelly Gambetta
Examiner
Art Unit 1792

kmg

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792